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Procedia - Social and Behavioral Sciences 150 (2014) 1277 – 1286

Procedia
Social and Behavioral Sciences

10th International Strategic Management Conference

Are Clusters Efficient For The Relation Between Milk Production And Value Added Per Capita In Regional Level? An Empirical Assessment

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Abstract

Clustering can occur in a region, sector and even in a country. Clustering is a new regional development model in which activities are concentrated on the region to establishment of sector specific networks and continue to their strength. This study examines the clustering status of dairy producers in Turkey region and operating in the same sector. And this study reviews the milk producers located in highlights the clustering characteristics of the sector and establishes the factors having an effect on the gross value added. The obtained results clearly confirm that there is a clustering effect for regional development in terms of value added per capita in Turkey.

Peer-review under responsibility of the International Strategic Management Conference.

Keywords: Clusters, Clustering and Regional Development, Gross Value Added, Milk Sector.

1. Introduction

Clusters emerged in various parts of the world in the history of economic relations due to closeness to natural resources, an entrepreneur starting business in the region, potential customers awareness of the agglomeration, a technological breakthrough in the region, availability of appropriate human resources in the region and accordingly they either developed into more complex cluster structure, or divided into sub clusters, or died of natural causes.

While industrialisation was the fundamental goal of regional policies in previous periods, it is now to foster competitive power through regional policies. The process of globalization, the emergence of new production processes

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Peer-review under responsibility of the International Strategic Management Conference.
doi:10.1016/j.sbspro.2014.09.144

and technological developments have recently reconfigured regional development policies. Need to accommodate the ever increasing global competition and the instances of developed regions that establish their economies on localized groups of enterprises have caused local, regional and national administrations to incline the policies formalized on entrepreneurial clusters.

The changes brought about by the technological developments and increasing volume of international trade during the globalization process have been accompanied by various changes in social and economic spheres. Among these changes comes the development of local/regional economies as competing units at international scale. The competitiveness of the regions has started to be defined by innovation capacity, collaboration of various stakeholders, and enhancement of social capital in addition to the performance of the enterprises. In this regard, regional development policies have been reshaped (Alsaç, 2010: 1-2). The importance of the collaboration among the enterprises, public institutions and non-governmental organizations was clearly set out. With the clustering concept, which has been popular recently, collaboration among stakeholders, competitiveness and innovation capacities of enterprises and regions are promoted. In this respect, clustering has come to agenda as a very attractive regional development policy tool (Alsaç, 2010: 3-4).

Recently in Turkey, various studies are made concerning the adoption and implementation of clustering approach especially in the regions which have sectorial agglomerations. For Yelkikalan et al (2012) these studies draw special attention as they indicate the presence of a serious inquiry and motivation related to actors with clustering potential in Turkey.

The focus of this study is to the effect of clustering approach as a regional development tool for gross value added in terms of clustering policies is taking place of our country.

In this paper, the outline as follows; first chapter in which literature review and hypotheses literature review and hypotheses were given, in second chapter, the empirical work/model were given and the results were discussed, in third and last chapter of the paper , general discussion and findings were discussed.

2. Literature Review And Hypotheses

2.1. Clustering

The theoretical background of the clustering modelling is based on mainly the works of Porter (1990, 1991, 1998, and 2000). The basis of the cluster approach is based on the concept of the industrial zone in (1890) Marshall (Asheim et al., 2006: 5). Researching economics of agglomeration and geographical distribution of economic activities have been growing since beginning of the 19th century. Studying the clustering approach in the regional level has experienced a growing interest in the 1990s.a

The clustering approach, based on reinforcing regional association between the enterprises as well as creating business network structures between geographically proximate parties involved in production of a product or service, is seen as a regional development model (Yelkikalan et al., 2012).

Clusters are originated by specialized suppliers, service providers, universities or companies of the related sector such as commercial enterprises (Hospers et al., 2009: 287). Clustering is enterprises and establishments associated with each other and concentrated on a particular geographic area (Porter, 1998; Porter, 2000). By introducing a new standpoint to nations, governments and local economies, industrial clustering imposes new roles to companies, governments and other institutions for enriching the competition power due to the formation for clustering is directly correlated with concept of global competitive power (Porter, 2000: 14-16). Therefore, we could say that clusters play an important role in developmet of SME (small and medium enterprises). The important role of clusters in regional and national development is generally accepted at different parts of the world. With their role in providing jobs, creating new business areas, developing technology, cooperation with international businesses, generating export

[a] For essential studies, see Porter, (1990); Porter, (1991); Krugman, (1991); Fujita and Mori, (2002) and Fujita and Mori (2005).

income, developing talent and human resources, cooperation with universities and research institutions are key to regional and national development (Sungur and Keskin, 2009; Kunt, 2010).

As stressed by Feser and Bergman (2000), Porter and Ketels (2009), and Ketels (2011), both concepts bring the analysis of location into that of firms competitiveness and they share the same focus on the impact of agglomeration on economic performance (Sedita et al., 2012).

Cluster approach which includes all actors in sector; purpose all actors in destinations obtain economic and social utilities and is concentrate on competition. Understanding the reasons for geographic concentration of economic activities has been a subject of study for a long time, and different aspects of the issue have attracted the attention of many scholars from various disciplines, ranging from sociology to economics (Öz, 2005). The concepts which are developed in regional development focus on geographic proximity as a pioneering factor of innovation (Madhok 1995; Cumbers and MacKinnon, 2004; Matuschewski, 2006; Deutz and Gibbs, 2008). In recent years, the management literature is becoming richer in respect of studies on this subject as well.

OECD (1999:157) emphasized to value of clustering in economy as follows;

"Clusters form a production network of companies, information producing agencies and clients that are strongly linked together in a chain of production ensuring added value to each other" .

For regional development, on the one side competence level of clusters is important for the economy through regional development, on the other hand clustering is more essential in the developed economies than in developing countries.

The clusters emerged because they improve productivity and competitive power and for the purpose of benefiting from government incentives and synergic outcomes.

The clustering approach, based on reinforcing regional association between the enterprises as well as creating business network structures between geographically proximate parties involved in production of a product or service, is seen as a regional development model (Yelkikalan et al., 2012).

Porter (1998: 206) stated that clustering is a form of network structuring occurred in a certain geographical area and highlighted that geographical proximity of companies and establishments improve the opportunity of doing business together by increasing the interaction between those (Gulati, 1995; Child et al, 2005; Gibbs and Humphries, 2009). The combination of the pshsical capital and human capital leads to negative or positive productivity levels according to their levels (Nicolini, 2011; Doruk and Söylemezoğlu(1), 2014; Doruk and Söylemezoğlu(2), 2014). All of the government efforts for improving and supporting clustering in a certain area make up the cluster policy i.e. determination of R&D investments for improving competitiveness, export policies, procedures for increasing productivity and regional development procedures can be listed as cluster policies.

The companies operating within that network should focus on creating value (Gulati et al., 2000). For example, innovation is one of the important factors of improving competitiveness in food and beverages sector (Rama 1996: 123). The national scale states that the framework of regional and spatial growth will be improved and regional development strategies and plans will be prepared in cooperation with development agencies (DPT, 2006: 117). It is seen that regional development policies of the new era have two essential purposes which are improving competitive edge of not only underdeveloped regions but also all other regions, and balanced distribution of welfare across the country. Thus a more balanced regional development concept will be developed where both competitiveness and convergence can be jointly ensured (Yaman and Kara, 2008; Yelkikalan et al, 2012).

2.2. The Milk Sector in Turkey

Since 2006, Turkey has been directly exporting milk and diary products to 94 countries and the milk export between 2006 and 2010 has increased by 89 %. In 2010, milk and dairy products exportation was 167 million dollars and increased up to 195 million dollars in 2011 (USK,2012).

Turkey is a country of which agriculture and livestock sectors are important. One third of the agricultural activities are based on stockbreeding.

Positive impacts of the raw milk support program are reflected on the total milk yield and data. The increase in quantity of milk receiving milk support was approximately 20 % whereas the increase rate in total milk was only 7 % ([TurkStat] Turkish Statistics Institute). Although 13 million tons of milk produced in a year is not sufficient in terms of Turkey's potential, milk yield has been increasing, developing recently and milk processing has become more sufficient (USK). National Milk Council (USK), TDSYD (Turkish Breeding Cattle Breeders Association), SETBİR (Union of Dairy, Beef, Food Industrialists and Producers of Turkey), ASÜD (Turkish Packaged Milk and Dairy Industrialists Association) are the actors supporting the sector as well as other cooperatives and unions dealing with animal breeding and milk yield, Ministries and institutions, establishments attached to the ministries (Ministry of Agriculture, 2007). Big farms and production facilities which have been established in recent years are becoming a competitive business line in the country and milk livestock segment has become an important agribusiness and source of income in Turkey, which is traditionally known as an agricultural country even if there has been some drastic changes. Top 20 countries in milk production are supplying approximately %75 of the entire world's production. Turkey is supplying %1.9 of the world's milk production with its 13.6 million tons of milk which only comes from cows (Tutar et al, 2012)

The top milk producers in Turkey can be classified by the most important producers, who produce 100 tons per day, between 200 and 500 tons per day, and between 1000 and 1500 tons per day, those are three subcategories. Accordingly, the firms which are producing 100 tons a day are, Çavuşoğulları, İtimat, Derya, Akpınar, Aygün, Kebir, Balkan, Ballı Süt, Çaycuma, Cebel. The firms which are producing 200-500 tons per day are; Kaanlar, Bahçıvan, Tahsildaroğlu, Eker, Muratbey, Akbel, Ekici, Kaysüt, Teksüt. The firms which are producing 1000 1500 tons per day are Sütaş, Ülker, Pınar, Danone, SEK, Yörsan ve Dimes (Tutar et al, 2012). In this article the most producing regions are considered for estimating whether there is cluster effect for the economy.

2.3. Hypotheses

The hypotheses of this paper are as follows;

H1: The regional clustering of milk production, which combines of water buffalo, goat, sheep and cow milk, is crucial for the economy in terms of value added per capita in regional level.

H2: Under the average production level, clusters are not efficient for regional development.

3. Methodology

In this study, generally the secondary data obtained from international, national and local establishments were used. Some of the data were taken from TurkStat (TUIK). The regional data were collected form TurkStat. The cow milk, goat milk, Water buffalo milk and sheep milk and gross value added per capita in regional level between 2004 and 2011 for 26 subregions in Turkey. The subregions are depicted in Table 1. And the clustered regions are shown in bold in Table 1[b].

[b] The clusters are determined according to USK (2012).

Table 1. Subregions in the sample

Region Number	Cities in the region
TR10	İstanbul
TR21	**Tekirdağ, Edirne, Kırklareli**
TR22	**Balıkesir, Çanakkale**
TR31	**İzmir**
TR32	**Aydın, Denizli, Muğla**
TR33	**Manisa, Afyon, Kütahya, Uşak**
TR41	**Bursa, Eskişehir, Bilecik**
TR42	**Kocaeli, Sakarya, Düzce, Bolu, Yalova**
TR51	Ankara
TR52	**Konya, Karaman**
TR61	**Antalya, Isparta, Burdur**
TR62	Adana, Mersin
TR63	Hatay, Kahramanmaraş, Osmaniye
TR71	**Kırıkkale, Aksaray, Niğde, Nevşehir, Kırşehir**
TR72	Kayseri, Sivas, Yozgat
TR81	Zonguldak, Karabük, Bartın
TR82	Kastamonu, Çankırı,Sinop
TR83	Samsun, Tokat, Çorum, Amasya
TR90	Trabzon, Ordu, Giresun, Rize, Artvin, Gümüşhane
TRA1	Erzurum, Erzincan, Bayburt
TRA2	Ağrı, Kars, Iğdır, Ardahan

For estimating clustering effect on the regional value added per capita, the average milk production for each variable is estimated. According to those average estimation, the dummy variables are generated for each variable. [c]

Before testing the hypotheses in panel data framework, we need to test whether the series has unit root by panel unit root tests. Levin,Lin and Chu (2002) panel unit root test is employed for testing the unit root of the series. All series are I(0) (stationary in the level) according the unit root test results.[d] Due to heteroskedascity and autocorrelation problems, Arellano (1987), Froot(1989) and Rodgers(1993) Panel Regression Models were estimated, which are in fixed, random effect and pooled regression model. The estimation results were depicted in Table 1, Table 2, Table 3, Table 4 and Table 5. Totally, 12 models were estimated which are in fixed, random and pooled for each milk production and real value added per capita in regional level. The simple model as following;

$$RVperC_{i,t} = \beta_0+\beta_1 X_{i,t}+\beta_2 Y_{i,t}+\beta_3 Z_{i,t} + \varepsilon_{i,t}$$

where

RvperC denotes real value added per capita in regional level

X =[goat milk production, water buffalo milk production, sheep milk production and cow milk production] for 26 subsection in Turkey

Y = Dummy variable for cluster regions

Z= interaction between cluster regions and RVperC

Table 1. Diagnostic Tests for Standard Estimations

	Model I: Random effect	**Model II: fixed effect**	**Model III: Pooled Model**
Table 1	Woolridge Test; F(1,25)=450.03, P value=0.00		
	LM Test for Heteroscedasticity = 319.71 P value=0.00	Modified Wald Test Heteroscedasticity $\chi2$ (26) = 2.6 p value=0.00	White Heteroscedasticity Test $\chi2$ (7) = 33.53, p value=0.00
Table 2	Woolridge Test; F(1,25)=90.93, P value=0.00		
	LM Test for Heteroscedasticity = 389.30, P value=0.00	Modified Wald Test Heteroscedasticity $\chi2$ (26) = 3845.65 p value=0.00	White Heteroscedasticity Test $\chi2$ (7) = 40.48, p value=0.00
Table 3	F(1,25)=1215.22, P value=0.00		

[c] For average milk production is 543802.175, 629.9125,26591.775 , 103077.9625 tonnes for cow,water buffalo ,sheep and goat, respectively.

[d] For saving space, the unit roots test results were not given here, however, it can be requested by the authors.

	LM Test for Heteroscedasticity = 280.16 P value=0.00	Modified Wald Test Heteroscedasticity $\chi2$ (26) = 4.4	White Heteroscedasticity Test $\chi2$ (7) = 40.82, p value=0.00
Table 4	F(1,25) = 141.987, P value=0.00		
	LM Test for Heteroscedasticity = 318.28 P value=0.00	Modified Wald Test Heteroscedasticity $\chi2$ (26) = 1.9 p value=0.00	White Heteroscedasticity Test $\chi2$ (7) = 47.92, p value=0.00

Table 2. Arellano(1987),Froot(1989) and Rodgers(1993) Panel Models Results

Dependent variable: RVperC	**Model I: Random effect**	**Model II: Fixed effect**	**Model III: Pooled Model**
Goat	-0.02 p value= 0.32	0.02 p=0.03	-0.07 (0.2) p value=0.00
DummyGoat	-7356.97 pvalue=0.00	-6845.19 p value =0.00	-9451.35 p value= 0.00
DummyGoat* RVperC	0.93, pvalue=0.00	0.91, pvalue=0.00	1.03, p value=0.00
C	9712.121	9124, p value= 0.00	10657.72 (0.00)
R^2	0.27 (within)	0.28 (within)	0.31
Ftest	-	R^2 =0.49	6.84, p value=0.002
Wald $\chi2$ Test	697.70 p value = 0.00	F=250.97, p value = 0.00	Ftest=244.55 (0.000)

Table 3. Arellano(1987),Froot(1989) and Rodgers(1993) Panel Models Results

Dependent variable: RVperC	**Model I: fixed effect**	**Model II: Random effect**	**Model III: Pooled Model**
Cow	0.01, p value= 0.00	0.01 p value=0.00	-0.001, p value=(0.84)
DummyCow	-5746.27, pvalue=0.00	-7132.311, p value = 0.00	-9025.105, p value= 0.00
Dummycow* RVperC	0.50, pvalue=0.00	0.66, p value= 0.00	1.005, p value=0.00
C	2398.08 (0.14)	4725.63 (0.00)	9775.04 (0.00)
R^2	0.49 (within)	0.48 (within)	0.25
Ftest	41.36 P value=0.00	-	5427.75, p value=0.000

Wald $\chi 2$ Test	-	210.14, p value = 0.00	-

Table 4. Arellano(1987),Froot(1989) and Rodgers(1993) Panel Models Results

Dependent variable: RVperC	**Model I: Random effect**	**Model II: fixed effect**	**Model III: Pooled Model**
Sheep	0.02, p value= 0.14	-0.01 p value=0.01	-0.001, p value=(0.04)
DummySheep	-5861.174, pvalue=0.00	-7706.28, p value = 0.00	-1035.46, p value= 0.00
DummySheep*RVperC	0.97, pvalue=0.00	0.96, p value= 0.00	0.95, p value=0.00
C	8222.122 (0.00)	10217.04 (0.00)	11246.791 (0.00)
R^2	0.26 (within)	0.23 (within)	0.36
Ftest	3567.81 P value=0.00	-	611.89, p value=0.000
Wald $\chi 2$ Test	-	4751.38, p value = 0.00	-

Table 5. Arellano(1987),Froot(1989) and Rodgers(1993) Panel Models Results

Dependent variable: RVperC	**Model I: Random effect**	**Model II: fixed effect**	**Model III: Pooled Model**
Water Buffalo	0.04, p value= 0.65	0.14 p value=0.28	-0.017, p value=(0.63)
Dummy Water Buffalo	-8393.38, pvalue=0.00	-7997.37 p value = 0.00	-9786.98, p value= 0.00
DummyWaterBuffalo* RVperC	0.92, pvalue=0.00	0.91, p value= 0.00	1.00, p value=0.00
C	9332.215 (0.00)	9079.78 (0.00)	9730.2 (0.00)
R^2	0.50 (within)	0.51 (within)	0.56
Ftest	-	216.81 (0.00)	88.60, p value=0.000
Wald $\chi 2$ Test	820.60 (0.00)	-	-

According to the estimation results, the interaction between cluster regions and gross value added per capita is significantly positively at %5 significance level. Those results show to us that clustered regions has positive impact on the gross value added significantly effected which between %50 (at least) and %103 level. F tests and Wald Test results are significant at %5 statistical level for all models. The goodness of fit of all models can be accepted

consistent due to there are omitted variables for explaining value added per capita in regional level, which between %23 and %46.

4. General Discussion and Conclusion

In the regions which has the most concentration, there are Provincial Sustenance, Agriculture and Livestock Headship, Integrated milk production facilities, co-operations such as Agricultural Development, Köykoop, Haykoop, Milk Producers Association, Agriculture Society, Türkvet and villagers small-scale attempts, Also the co-operations which produce and sell milk only from breeding cattles, cows, sheeps, Goats are incentives, projects and subsidies approved by the Ministry of Agriculture, Livestock and Nourisment (Yelkikalan et al, 2012). Except those, the reasons of concentration on milk production are based on geographically closeness to facilities of the firms that are integrated milk facilities and produces milk products. The reason is besides the obligation of laws, geopolitical, socio-economical, socio-cultural structure considers the sell that co-operations do is a more beneficial.

The main aim of the paper is investigating whether the cluster effect of milk production on real value added per capita in regional level positively or not. The results that we obtained from panel data estimations, there is cluster effect of milk production on real value added per capita that is significant and positively.

5. Recommendations for Further Studies and Limitations

This paper shows empirically that, clustering may possible for developing countries, in case of Turkey in this paper. This paper shows that there may cluster effect in the regional level for developing countries. Due to lack of data, cross country level study was not done, if the data/study/experiment find cross country data may show international trend of clustering for developing countries. Further studies may concentrate on that issue.

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